

## REVIEW PAPER

# ARTIFICIAL INTELLIGENCE POLICIES FOR HIGHER EDUCATION: MANIFESTO FOR CRITICAL CONSIDERATIONS AND A ROADMAP

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## ABSTRACT

This paper investigates the relationship between artificial intelligence (AI) technology and educational policy in higher education, highlighting key research and implementation. The paper focuses on critical considerations for AI policy development with a view to producing a roadmap focused on contextual higher education AI policies. The rapid development of AI presents both significant opportunities and challenges for higher education institutions in Europe and globally. As AI technologies become ubiquitous, integrated into teaching, learning, and administrative functions, it is essential to identify critical considerations at the core of the AI integration process, namely: (1) regulatory framework, (2) stakeholder-specific guidelines, (3) AIED research, and (4) AI literacy. As a starting point, the paper presents a review of existing AI policy frameworks within higher education, drawing on recent empirical research, identifying four design and implementation priorities for higher education stakeholders aiming to create responsible AI governance frameworks. As a result, we propose a roadmap designed to be used as strategic planning instrument for higher education stakeholders developing AI policies and guidance. In proposing a strategic roadmap for AI policy development, the work offers valuable insight into how higher education can effectively leverage the potential of AI whilst ensuring ethical considerations, equity, and maintaining academic integrity. Additionally, the paper contributes to the ongoing discourse regarding AI's role in higher education in proposing research pathways that will benefit all stakeholders involved in the academic ecosystem.

**Keywords:** Artificial Intelligence in Education (AIED), AI policy development, higher education, framework for strategic planning, design and implementation roadmap



MAP EDUCATION  
AND HUMANITIES

Volume 6

ISSN: 2744-2373 / © The Authors.  
Published by MAP - Multidisciplinary  
Academic Publishing.

Article Submitted: 06 October 2025  
Article Accepted: 01 November 2025  
Article Published: 02 November 2025



Publisher's Note: MAP stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

<https://doi.org/10.53880/2744-2373.2025.6.61>



## HOW TO CITE THIS ARTICLE

Stracke et al. (2025). **Artificial Intelligence Policies for Higher Education: Manifesto for Critical Considerations and a Roadmap**. MAP Education and Humanities, 6, 61-73.  
doi: <https://doi.org/10.53880/2744-2373.2025.6.61>



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### 1. Introduction

As rapid integration of Artificial Intelligence (AI) technologies becomes ubiquitous in Higher Education teaching and learning, research and administrative processes, it raises important ethical and policy questions to ensure equitable, safe and effective implementation. Society's need to guide the development of Artificial Intelligence (AI) technologies is becoming more widely acknowledged. Guidance is crucial for maximizing AI benefits and managing risks, ensuring that AI systems are designed to serve the common good, align with human values and ethical principles, and preventing misuse (Stracke, 2025).

Recent studies have shown a marked increase in the use of AI in higher education, with applications ranging from intelligent tutoring systems to predictive analytics for student success (Bećirović & Mattoš, 2024; Crompton & Burke, 2023). The adoption of AI tools in Higher Education has been driven by their affordances, to personalise learning experiences, provide real-time feedback and automate routine tasks, thereby allowing educators to focus on more complex instructional activities (Slimi, 2023). However, as these technologies continue to evolve, ethical considerations become of paramount significance as robust measures are required to protect individual human rights such as data privacy and compliance with regulations whilst ensuring transparency and fairness in use. Developing flexible regulatory frameworks that can adapt to rapid technological advancements is a complex task if measures to be undertaken prioritise equitable distribution of benefits of AI across all societal segments.

This paper will provide a comprehensive overview of the current state of AI policies in Higher Education, drawing on recent empirical studies. It will present a roadmap for developing AI policies for Higher Education by examining the intersection of AI technology and educational policy and contribute to the ongoing discourse on how to harness AI's potential best so that all stakeholders in the higher education ecosystem benefit.

### 2. Background

AI is a transformative force in education with the potential to revolutionise learning experiences and create new opportunities for personalised education (Holmes & Tuomi, 2022; Zheng, Niu, Zhong & Gyasi, 2023). The integration of

AI in education is part of a global context of rapid technological innovation, where AI-based tools such as intelligent tutoring systems, predictive analytics and personalised learning platforms are redefining the way students and teachers interact with knowledge. Artificial intelligence has become a priority issue for governments and international organisations (Educause, 2022; UNESCO, 2021a, 2021b, 2023; OECD, 2024), as it now impacts on all areas of human activity.

Existing literature indicates significant progress in the development of AI applications for education (Zheng, Niu, Zhong & Gyasi, 2023). Recent studies have shown that AI-based tools can improve the personalisation of learning by adapting content to the specific needs of students through machine learning systems. In addition, the use of predictive algorithms provides institutions with the ability to identify students at risk of dropping out early and thereby improve course completion rates (Tlili et al. 2024; Bozkurt, et al. 2023). However, there is no shortage of criticism (Crawford, Allen, Pani & Cowling, 2024). Research suggests that the indiscriminate adoption of these technology risks creating new forms of inequality, particularly in contexts where technological resources and digital skills are limited (Baker & Haw 2022). Other concerns relate to issues of informed consent, invasion of privacy, biased data collection, fairness and accountability (Nguyen et al. 2023). Although AI systems are designed to be unbiased, they may perpetuate or even exacerbate existing biases if the original data on which they are trained and their proxies are not accurate and free from bias and incorrect assumptions (Miao, Holmes, Huang & Zhang, 2021). There are also concerns about the impact of AI on the exercise of democracy and active citizenship (ECAP, 2023; Burr, Taddeo & Floridi, 2020; Dignum, 2021). Many educational institutions are adopting AI tools without a clear regulatory framework, risking ethical issues related to privacy, data security and transparency of algorithms (Stracke, 2024; Stracke et al., 2024). The current widespread adoption of unregulated AI applications in schools poses a serious threat to democratic civil society and individual freedom and liberty (Williamson, Molnar & Boninger, 2024). To understand the challenges, we face in education and to increase trust in AI systems, the concept of Explainable AI has recently emerged. This term refers to movements, initiatives and efforts to ensure that algorithmic decisions and the data that drive these decisions can be explained in a clear and understandable way to end users and other stakeholders (Adadi, & Berrada, 2018). All

these findings highlight the need for guidelines for the responsible use of AI in education.

A detailed study was conducted by Stracke et al. (in press) to analyze and compare AI policies for higher education. 15 AI policies were selected from governments and universities of eight European countries. Their evaluation compared four potential target groups (students, teachers, education managers, and policymakers) emphasizing their commonalities and gaps within the selected AI policies. The final conclusion is that unique ethical and social challenges are caused by AI, including data security, algorithm transparency, social impact and educational quality, and ethical responsibility (Stracke et al., in press).

There is still no clear consensus on the ethical dimensions of AI as a technological practice, meaning its development is primarily shaped by the principles of those who create and implement it. As a result, the ethical considerations reflected in policies and declarations are often personal and subjective perspectives put forward by those involved. This complexity is further heightened by the interplay between regulatory adaptations and the rapid pace of AI advancement. To ensure that AI in higher education is deployed ethically, transparently, and with respect for human rights, regulatory frameworks are essential at all levels—nationally, internationally, and institutionally. While a broad framework can provide a theoretical foundation, practical guidelines are necessary to offer targeted, context-specific responses categorized by topic, sector, and audience.

Currently, the development of regulations and ethical frameworks for AI use in universities remains in its early stages. Although European governments are making strides in establishing regulatory standards for AI in the public sector, comprehensive national policies specifically addressing the ethical and responsible use of AI in education are still lacking. At present, regulatory efforts in higher education are largely fragmented, with most initiatives emerging from grassroots, bottom-up approaches. Universities and academic institutions are only beginning to implement structured frameworks for AI ethics and governance. Regulations tend to lag behind technological advancements, making it both inevitable and potentially beneficial for institutions to take the lead in shaping AI policies and practices—ensuring that regulations are informed by the real-world implications of the technology.

While existing AI and higher education policies provide a foundational framework for integrating AI technologies into educational institutions, several critical gaps remain that could undermine their effectiveness and equity. Ethical considerations such as bias and fairness, are often addressed in guidelines but lack comprehensive policies that ensure accountability and transparency in AI operations (Lowe 2023; European Commission, 2020). This oversight could lead to perpetuation of existing inequalities and the introduction of new forms of discrimination that could compromise the ethical deployment of AI in Higher Education. The current policies on data privacy and security measures often fallback on compliance with regulations but lack clear robust frameworks that would safeguard data against breaches and misuse which could erode public trust in AI technologies and institutions using them. Moreover, as AI technologies proliferate, it could exacerbate educational inequities by further widening the digital divide, potentially leaving marginalised and under-represented groups at a disadvantage (Imbrie, 2024; UNESCO, 2021) if existing policies do not focus on a roadmap of comprehensive guidelines for promoting critical AI literacy in higher education stakeholders.

Recent research provides groundwork for developing comprehensive and relevant guidelines to ensure the ethical use of AI in higher education, enabling all stakeholders to navigate its complexities responsibly. From this perspective, we have identified several key elements necessary for creating effective guidelines on AI ethics and responsible use in higher education. These guidelines should be tailored to different target groups, clarify roles in AI interactions, encompass various application areas, and establish a well-defined scope of guidance.

Our findings emphasize the need for further, particularly evidence-based, research to assess both the potential and practical impact of AI in higher education. It is crucial to integrate AI use in education with education about AI—commonly referred to as AI literacy—to ensure that all stakeholders, including students, educators, education administrators, and policymakers, understand both the opportunities and risks associated with AI in higher education. Ultimately, AI itself is neither ethical nor moral; rather, it is people who bear this responsibility. Therefore, AI policies in education should be designed to support institutions and individuals in upholding ethical responsibilities.

Furthermore, our research reiterates the necessity of continued evidence-based inquiry into the impact of AI in higher education while reinforcing the importance of combining AI implementation with AI literacy initiatives.

Policies are being developed to inform the ethical, safe and effective integration of AI into educational practices. International agencies including the European Commission, UNESCO, and the Council of Europe are actively engaged in creating and enforcing suitable guidelines and frameworks that encourage the moral and responsible application of AI.

UNESCO has taken a number of steps to incorporate AI skills into education, focussing on AI independently of other digital technologies in education, despite the fact that regulations governing AI integration are still in their early stages (Stracke et al., 2024). UNESCO approaches AI in education from a human-centered perspective, emphasising the development of human capabilities while also promoting social justice, sustainability, and human dignity. UNESCO's "Ethical Framework for AI" (Miao et al., 2021) establishes some fundamental guiding principles, such as transparency, equity, accountability, and inclusiveness, to ensure that these technologies are used ethically and in accordance with human rights. To help nations support teachers and students in understanding the potential and risks of AI so they can use it responsibly, ethically, and safely in education and beyond, UNESCO unveiled two new frameworks during Digital Learning Week 2024. The focus on AI literacy is based on the claim that AI presents novel ethical and social challenges due to the affordance which mimic human behaviour (Franke, 2022). Addressing these issues requires specialised skills that go beyond traditional digital literacy. These challenges necessitate specialised skills that extend beyond the scope of traditional digital literacy. The AI competency framework for students (Miao et al., 2024) is intended to help curriculum developers, educators, and legislators give students the abilities, values, and information they need to engage with AI in productive ways. Similarly, the AI Competency Framework for Teachers (Miao, & Cukurova, 2024) offers a framework for national competency development and training initiatives, with an emphasis on teachers' ongoing professional development. The framework identifies five core competency areas, with the goal of preparing teachers to use AI responsibly and effectively while minimising potential risks to students and society.

The Council of Europe is following a similar approach but combining two complementary activities and developments to achieve international conventions (Council of Europe, 2024a). Based on the mandate by all its 46 Member States, the Council of Europe works on a binding international law on the regulation of AI use in education as well as on a global recommendation for AI literacy to be included in national and local curricula (Council of Europe, 2023a, 2023b). The rationale is that AI competence frameworks can be a valuable and authoritative starting point for regulating AI education and adoption. They offer clear, ethical, and forward-thinking advice to help schools prepare students and teachers to use AI responsibly, so that AI can support human decision-making rather than replace it (Stracke, 2024).

Finally, the AI Act of the European Union, the first artificial intelligence regulation that went into force on August 2, 2024 and focuses AI providers (European Union, 2024). The policies and guidelines of international organisations converge on the concept that education and awareness are key tools for ensuring AI use that is respectful of both human rights and ethical regulations.

The AI Act highlights the importance of the ethical component in the creation and application of such technologies and invokes the principles of accountability and transparency to reduce the possibility of detrimental effects on fundamental rights, particularly the right to education.

There is widespread consensus on the importance of education and awareness as key tools for ensuring the use of AI that respects human rights and ethical norms. The increasing integration of AI into society necessitates the development of specific AI literacy in order to better understand its opportunities and risks. This is crucial for safeguarding human rights, preventing discrimination, and ensuring that the benefits of AI are distributed fairly. In order to prevent harmful uses and foster widespread understanding, the AI Act highlights the importance of literacy regarding the use of AI technologies, including their ethical implications (Recitals 20, 56; European Union, 2024).

To foster a protective culture for vulnerable groups of people who might be harmed by the misuse of AI requires educating students, teachers, school administrators, and policy makers (Recitals 93; European Union, 2024). The AI Act's specific provisions help to prevent potential rights violations

by protecting these groups from the dangers posed by high-risk AI systems (Article 27; European Union, 2024).

As a result, the first international AI regulation was finalized and approved by the Council of Europe and its 46 Member States: The Framework Convention on Artificial Intelligence and Human Rights, Democracy and the Rule of Law (Treaty 225) at went into force on September 5, 2024 (Council of Europe, 2024b). It focuses individual rights and the core values of human rights, democracy and rule of law.

Building public trust in use of AI technologies demands more transparent and explainable AI systems that must be prompted by existing policies (Lowe, 2023). However, the static nature of current AI policies and regulations could potentially stifle the demand for a regulatory framework that is flexible and adaptive to respond to emerging challenges as AI technologies advance with time. Addressing these gaps through ongoing research, collaboration and the development of comprehensive and adaptable policies is essential for harnessing innovation with AI in higher education that benefits all relevant stakeholders.

The literature reflects a growing recognition of the need for considered AI policies in higher education, emphasizing the importance of addressing ethical challenges, ensuring equity, and fostering responsible use of AI tools to enhance teaching and learning outcomes. Spivakovsky et al. (2023) underscore the necessity of defining the scope of AI applications through institutional policies, enabling the academic community to determine appropriate uses of AI in the educational process and to prevent its use in areas where ethical norms are violated. Chan's (2023) study proposes an AI Ecological Education Policy Framework for university teaching and learning, incorporating pedagogical, governance, and operational dimensions, and advocating for active student involvement in policy creation. Atkinson-Toal and Guo (2024) reveal widespread methods of integrating AI within policies of UK Russell Group universities, alongside the government's position on generative AI in the education sector, while the study of Evangelista (2025) highlights the need for clear institutional guidelines, and Dabis and Csáki (2024) explore the first responses of universities globally to the challenges of generative AI. Azevedo et al. (2024) argue that while much attention has been given to tools like ChatGPT and their impact

on student writing and academic integrity, there has been less focus on how emerging AI policies affect faculty work, sometimes in inequitable ways. Moore et al. (2024) stress the importance of audience-focused, clearly written policies grounded in strategies to promote ethical AI use in academia and the workforce, offering practical tips and sample policies for guidance.

Despite the progress made in the development of AI policies in higher education, there still remains significant gaps in the literature. Further research is needed to explore how AI can be integrated into university curricula and research practices in a way that promotes inclusivity, ethical considerations, and sustainable outcomes.

### 3. Methodology of Narrative Review

Our study examined "Artificial Intelligence Policies for Higher Education" using a *critical narrative review* methodology with the objective to develop a "Manifesto for Critical Considerations and a Roadmap". In contrast to a systematic review, which often concentrates on a specific subject within a particular context and utilises a predetermined process to synthesise results from related studies, a narrative review can incorporate a wide range of literature and offer a comprehensive view along with interpretations and discussion (Sukhera, 2022). Further, a narrative review approach allows for the comprehensive and meticulous determination of the primary research on the subject, enabling the drawing of inferences based on the researchers' professional experiences and pre-existing theories (Demiris et al., 2019).

Topics that need an effective synthesis of research evidence, which may be broad or complex, and that call for in-depth, sophisticated analysis and interpretation are frequently well-suited for narrative reviews (Greenhalgh et al., 2018). Likewise, this approach enables researchers to describe what is already known about the topic and perform subjective evaluation and critique of reviewed studies (Sukhera, 2022). In our study, an extensive searching technique was implemented across numerous internet-based databases including Web of Science as the most restrictive indexing service of peer-reviewed journal publications. The sources of information for the analysis were chosen based on its timeline (2020-2025), its connection with the research subject, and dissemination in quality publications.

By employing narrative reviews in the process of reviewing the literature within the topic, scholars are able to first describe what is already known and the current issues with the topic, then advance the body of knowledge by generating new insights from different perspectives as well as a new theory (Rumrill & Fitzgerald, 2001). Therefore, this method enabled to investigate the current status of AI policies for higher education, as represented in recent publications, in a comprehensive thematic manner. By choosing and collecting relevant information from previous publications and addressing inconsistencies using a consensus decision-making procedure, the researchers carried out data extraction. Likewise, researchers were able to thoroughly identify and arrange common themes pertaining to artificial intelligence policies for higher education by analysing and synthesizing the records from selected publications using a thematic analysis approach (Naeem et al., 2023). Thus, these studies can be helpful in examining under-researched subjects as well as in providing fresh perspectives on established, thoroughly studied domains (Sukhera, 2022) in our case artificial intelligence policies for higher education and proposing the new insights on these policies and advancing this field.

The foundation for this narrative review was our research objectives as well as the socio-technical system theory, which aims to illustrate and address the theoretical and practical challenges of integrating technology into educational systems (Ropohl, 1999). This conceptual framework has been also successfully used in numerous prior studies (Onesi-Ozigagun et al., 2024; Vinay & Surendra, 2024) which explained the reciprocal interactions between individuals and the integration of AI technology and its implications for organisational transformation (Dervić et al., 2025).

The *critical narrative review* approach, employed in this study and which proposes a narrative synthesis of literature through an interpretative lens, implies the interpretation which “combines the reviewer’s theoretical premise with existing theories and models to allow for synthesis and interpretation of diverse studies” (Sukhera, 2022, p. 416). In order to gather data and gain thorough and deep insights into different facets of policies for artificial intelligence for higher education, we examined studies that used a variety of methodological techniques.

## 4. Results and Discussion: Manifesto and Roadmap

AI policy development in higher education should be informed by various critical considerations, including overarching regulations and guidelines, operational guidance (implementation), and individual AI literacy. Firstly, there needs to be an understanding of the overall regulations and guidelines that govern the ethical use of AI. Additionally, operational guidance is essential for implementing effective strategies. Furthermore, promoting AI literacy among students and staff is imperative. This ensures that everyone is equipped with the knowledge and skills needed to responsibly and effectively navigate the complexities of artificial intelligence.

Aiming to facilitate the strategic policy planning processes for the use of AIED systems across countries, we propose a policy priority framework. This framework is intended to be used as strategic planning instrument for higher education stakeholders developing AI policies and guidance taking into account the cultural diversities and context of each country (i.e., digital education readiness, AI readiness, etc.). This is followed by a strategic roadmap for AI policy development, aiming to offer valuable insights into how higher education can effectively leverage the AI potential while ensuring ethical considerations, promoting equity and maintaining academic integrity.

Aiming to enhance strategic policy planning for the ethical and responsible use of AI in higher education institutions across countries, we investigated the relationship between AI technology and educational policy in higher education, concentrating on critical considerations for AI policy contextualisation.

Our resulting manifesto proposes a roadmap that could serve as an instrument for practical implementation in multiple given specific situations and contexts.

### Manifesto: Critical considerations for AI policy development

The emerging critical considerations for stakeholders developing and designing an own AI policy in their own institution include:

### Critical consideration 1: Regulatory framework

An **overarching framework** can provide a theoretical approach to the topic that will guide the ethical and responsible use of AI in higher education. At the same time, such framework should encompass practical guidelines that can offer contextualized answers to questions clustered by topic, sector, target group, etc. Ensuring this way consistency and coherence across different levels of education.

In addition, it is important to promote **collaborative and co-creation approach**, involving all stakeholder segments, including students, teachers, parents, administrators, and policy makers; that instead of limiting policy development initiatives to specific educational levels or target groups. Such an inclusive approach will ensure that the proposed frameworks are comprehensive and reflect the direct needs and interests of all the involved stakeholders of the higher education community.

To ensure the effectiveness of such regulatory frameworks, it is important to adopt a **risk-based approach**, aligned with the EU Artificial Intelligence Regulation (usually known as AI Act (EU AI Act 2024/1689) and the Framework Convention by the Council of Europe (CoE, 2024). The AI Act addresses AI providers and classifies AI systems based on their potential risks, which shapes the regulations accordingly. The Framework Convention focuses individual and global rights and in particular the values of human rights, democracy and rules of law for the deployment of AI systems and services. Both frameworks however do not explicitly address education.

In addition, the **contextualisation of the practical guidelines for the implementation of the regulatory frameworks** will provide a set of clear directions linked with the use of AI systems in specific educational contexts adapting to the cultural and pedagogical needs. Acknowledging that children and education, constitute unique cases, there is a need for a legal framework aimed at regulating AI systems within educational environments, as highlighted in the Council of Europe Preparatory Study for the Development of a Legal Instrument on Regulating the Use of AI systems in Education (CoE, 2024). This proposal for a comprehensive legislation aims to address the distinct challenges of the use of AI in education while ensuring the protection and

promotion of human rights, democracy, and the rule of law.

### Critical consideration 2: Stakeholder-specific guidelines

Customized guidelines are needed to meet the specific needs of each group involved: it is important to ensure that all stakeholders (educators, institutions, children, parents) play an active role in ethical AI application in Education. Therefore, guidelines and policies should be tailored to their needs and roles of the different stakeholders taking into account their distinct needs for understanding and utilising AI system in education as well as evaluating their effectiveness. In addition, they should ensure that all stakeholders can deal responsibly with the complexities of AI.

These guidelines should address different target groups, define roles in AI interaction, cover diverse application areas, and provide a clear scope for their guidance. An agile approach for the development of guidelines should be adopted in order to ensure alliance with the evolving aspects of the use of AI in education. Furthermore, the country cultural and digital education readiness level should be taken into account.

### Critical consideration 3: AI&ED Research

Institutional AI policy development should be guided by and aligned with AI and Education (AI&ED) research.

AI&ED research is required to analyse and evaluate the impact of AI use in education (AIED) and the need for AI literacy. Such research should be based on evidences to determine the potential and practical impact of AI in higher education.

In particular, there is the need for evidence-based research to analyse precise conditions and long-term effects. The monitoring and evaluating of the use of AI systems in Education is crucial to identify potential impact and gaps of related AI policies.

### Critical consideration 4: AI literacy

There is an **urgent need to combine AI use in (higher) education with education about AI**, often called AI literacy, to ensure that all stakeholders and target groups (students, teachers, education managers and policy makers) are aware of the potential opportunities and risks of AI use in (higher)

education. In the final analysis, AI is not ethical nor moral; people are.

AI literacy must encompass the ethical use of artificial intelligence as it grows in education. Students and teachers need skills to evaluate and use AI responsibly, balancing technical abilities with ethical considerations (Zimmerman, 2018). Literacy programs should involve the whole school community, including parents, focusing on evaluating AI-generated content and recognizing bias to uphold academic integrity.

The AI Act (EU AI Act 2024/1689) recently formalised the concept of AI literacy as the obligation for AI system vendors and those who deploy systems to devise appropriate measures to ensure a sufficient level of understanding of AI's functioning, potentialities, limitations, and risks. Even though AI is a long-standing field, most of the research on how to develop non-expert literacy has been published in recent years, and discussions on how to improve it are ongoing, in part because it must be funded on other types of competences, such as digital literacy (European Union, 2024).

Issues raised in the AI literacy debate revolve around the importance of ethical AI use, which summarises the ethical concerns and challenges associated with the regulation and governance of AI technologies for a sustainable development that balances the undeniable benefits with the need to protect universally recognised values through a risk-anchored approach (Jobin et al., 2019).

Integrating ethics into AI literacy programs is essential for responsible AI use that benefits society (Ng et al., 2021). Educating developers, users, and policymakers fosters a technological culture that balances innovation with respect for fundamental rights (Microsoft, 2021). Understanding AI's social and moral implications is vital to prevent discrimination and ensure equitable distribution of technology's benefits in education (Burgsteiner et al., 2016; Ghallab, 2019).

AI literacy should include training to identify biases in data and models, ensuring equity and transparency in educational settings, where automated decisions can significantly impact students and teachers (Gong et al., 2020). Promoting principles like transparency and human oversight is crucial for understanding and tracing automated outputs, especially in high-risk systems (Fourtané, 2020).

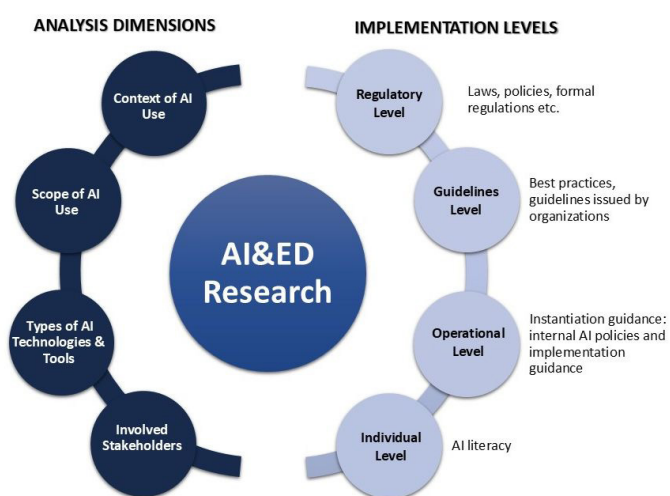
AI literacy enhances responsible technology use by raising awareness of privacy, data security, and algorithmic discrimination (Smith et al., 2012; Dietterich & Horvitz, 2015). Educating stakeholders about the significance of core values such as privacy, dignity, and equality builds trust in technology (Druga et al., 2019). This combined understanding empowers students and educators regarding data use and the biases that may affect their learning experiences.

AI literacy helps to demystify these technologies, making them more accessible to everyone and encouraging a more realistic understanding of their capabilities and limitations, all while avoiding new forms of social exclusion.

### Roadmap for AI policy development within HED institutions

The roadmap is our proposal for the implementation process and pathway for the alignment of the four priorities. It consists of analysis dimensions for the design of an individual AI policy for a higher education institution and implementation levels that have to be addressed. AI&ED research should be in the centre and could provide support for all aspects and processes of such an individual AI policy development. The following figure 1 presents the overview of this proposed roadmap.

**Figure 1:** Contextualised AI policy development in higher education institutions



The task of AI policy development within HED institutions is about customisation and adaptation, rather than about uniformity. Institutional policies vary based on the specific application scope and setting, as they must be tailored to meet particular implementation needs and adapt to unique environmental constraints. Therefore, identifying the critical aspects of an AI policy poses a challenge that requires a systematic approach.

In the present work, we map a path for the development of contextualized AI policies and guidelines within higher education institutions. The proposed model supports a comprehensive understanding of the complexities affecting institutional AI policy design by contextualizing each critical consideration and emphasizing its interrelation with other important analysis dimensions. Four key interrelated dimensions of analysis are identified: "Scope of AI Use", "Context of AI Use", "Types of AI Technologies and Tools", and "Involved Stakeholders", representing the "what", "where", "how", and "who" of AI implementation within the HED institution (Table 1).

**Table 1.**  
*Analysis Dimensions*

Analysis Dimension	Content	Examples
Scope of AI Use	Use Cases for AI Implementation in the Higher Education Institution	Teaching and learning, Research, Administration, Planning
Context of AI Use	Characteristics of the HED institution	Characteristics of the implementation environment  Existing barriers and enablers
Types of AI Technologies & Tools	Technology-agnostic classification of the various capabilities and limitations of AI technologies and tools	Technology attributes, limitations, and constraints
Involved Stakeholders	User groups for whom this policy is intended and their roles regarding AI systems and tools.  Users of AI tools or Developers/designers/buyers of AI systems	Teachers, students, managers and administrators, policy makers etc. acting as Users of AI tools or Developers/designers/buyers of AI systems

Analysing a specific aspect of AI regulation through the proposed Analysis Dimensions can provide a solid foundation for making critical decisions during the development of AI policy. This approach allows policy developers to assess the overall AI deployment setting and to interpret aspects related to each Analysis Dimension appropriately. The significance of each Analysis Dimension must be explored, including the dependencies and correlations among attributes within this and other dimensions. Once the contents of each Analysis Dimension have been identified, it is important to examine the interconnections among them. This means understanding how a specific analysis attribute affects and/or is influenced by other analysis attributes. After this exploration, policy developers can translate these insights into clear rules and conditions to include in the policy.

Additionally, AI policy development within HED institutions should be informed by **collective knowledge** across relevant AI policy **Implementation Levels** regarding overarching regulations and guidelines, operational guidance, and stakeholder accommodation. There needs to be an understanding of overarching regulations and guidelines on the ethical use of AI in HED, of relevant operational guidance regarding policy implementation, and of the influence of the human factor in terms of AI literacy.

The long-term effectiveness of an institutional AI policy largely depends on how closely its proposed provisions align with and adhere to **AI&ED research**. This means that the developed policy should be evidence-based and informed by ongoing research. It should integrate best practices and insights from empirical studies, and address current challenges. Integrating flexibility into the development of AI policies is essential for ensuring that these regulations can effectively respond to evolving challenges, changes in regulatory provisions, and rapid technological advancements. This adaptability is vital for maintaining the responsible and ethical application of AI technologies within the HED institution.

## 5. Conclusions

AI has the potential to significantly improve the educational experience by making educational pathways more inclusive, adaptive and accessible. However, these opportunities are accompanied by ethical and social challenges that challenge the traditional role of the educational institution and

raise new questions about the role of the educator in teaching.

The potential of AI to significantly reshape societies, economies, and educational systems differs from other digital technologies because of its potential to profoundly reshape societies, economies, and educational systems. In contrast to traditional ICTs, artificial intelligence (AI) presents particular ethical and societal problems, including concerns about accountability, transparency, privacy, and equity.

To address these challenges, the development of AI in education needs to be guided by robust and inclusive governance. This means establishing guidelines and policies that ensure the responsible and sustainable use of AI. Governance must involve a plurality of actors, including educators, students, administrators, ethicists and civil society representatives, to ensure that each decision takes into account different perspectives and potential impacts. It is also crucial to promote transparency in decision-making processes, ensuring that algorithms are understandable and that the criteria for using AI are clear and shared.

Finally, governance must include mechanisms for ongoing monitoring and evaluation to identify and address any critical issues in a timely manner to ensure that AI contributes effectively to improving the quality of education without compromising the core values of the education system. Just the contrary: the education system and its stakeholders (and in particular the single educators) have to take and keep the responsibility to decide on the AI use in education depending on the intended learning objectives and given educational situation and context.

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